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(11) (A) No. 1 147 176

(45) ISSUED 830531

(52) CLASS 81-87

(51) INT. CL. B25B 13/06³

(19) (CA) **CANADIAN PATENT** (12)

(54) ADJUSTABLE EXTENSION FOR SOCKET WRENCHES OR THE LIKE

(72) St. Charles, Fern,
Canada

(21) APPLICATION No. 350,018

(22) FILED 800416

(60) SUPPLEMENTARY DISCLOSURE FILED 820405

No. OF CLAIMS 17

Canada

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ADJUSTABLE EXTENSION FOR SOCKET WRENCHES OR THE LIKE

BACKGROUND OF THE INVENTION

This invention relates to new and useful improvements in extensions for wrench sets and the like.

Conventionally, a socket wrench set is provided with a plurality of nut and bolt engaging sockets having a squared recess in one end engageable with a corresponding squared end on a standard handle, pivoted type handle or a ratchet handle which normally extends at right angles from the longitudinal axis of the socket when the socket is engaged upon the handle.

Also provided in the majority of such socket or ratchet sets is one or more extension rods which enables the handle to be spaced from the socket so that the socket can be utilized in locations where adjacent components may prevent rotation or partial rotation of the handle.

However, such extensions are often inconvenient for the circumstances within which the socket set is being used. For example, when being used on an automobile engine, it is often desirable to be able to preselect the length of the extension so that the handle can be positioned in the most convenient location for efficient operation, but with only one or at the most, two fixed extensions being supplied,



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this is often impossible.

SUMMARY OF THE INVENTION

The present invention overcomes these disadvantages by providing firstly, an extension for socket wrenches which is adjustable within limits of the components thereby enabling the most convenient length to be determined between the socket and the offstanding handle. Secondly, the same principle can be incorporated in the handle portion, either standard ratchet or pivoted, so that the effective length thereof can be adjusted.

In accordance with the invention there is provided an adjustable extension assembly for socket wrenches and the like comprising in combination a hollow engaging portion and an extension shaft portion slidably engageable therein for lengthwise movement relative thereto, means on the distal end of the extension shaft portion operatively engageable with an associated socket or the like, means to prevent rotation of said extension shaft portion relative to said hollow engaging portion and means to detachably clamp said extension shaft portion to the said hollow engaging portion against relative lengthwise movement one with the other, said means to detachably clamp said extension shaft portion to said hollow engaging portion including a resilient, slightly tapered, truncated cone-shaped end formed on the end of said hollow engaging portion engaged by said extension shaft portion, at least one

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longitudinally extending slot formed through the wall of said truncated cone-shaped end extending from the distal end thereof inwardly therefrom, said truncated cone-shaped end being screw threaded and an internally screw threaded, tapered, locking sleeve slidably over said extension portion and screw threadably engaging said truncated cone-shaped end, the tightening of said locking sleeve on said truncated cone-shaped end compressing said end around said extension portion and clamping same against endwise movement relative to said hollow engaging portion.

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With the foregoing in view, and other advantages as will become apparent to those skilled in the art to which this invention relates as this specification proceeds, the invention is herein described by reference to the accompanying drawings forming a part hereof, which includes a description of the preferred typical embodiment of the principles of the present invention, in which:

DESCRIPTION OF THE DRAWINGS

10 Figure 1 is a side elevation of the extension handle assembly.

Figure 2 is a fragmentary longitudinally cross sectioned exploded view of the three components forming the assembly.

Figure 3 is a cross sectional view along the line 3-3 of Figure 2.

Figure 4 is an end view along the line 4-4 of Figure 2.

Figure 5 is an end view along the line 5-5 of Figure 2.

20 Figure 6 is an end view along the line 6-6 of Figure 1.

Figure 7 is an end view along the line 7-7 of Figure 1.

In the drawings like characters of reference indicate corresponding parts in the different figures.

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Proceeding therefore to describe the invention in detail and describing first, the structure shown in Figures 1 - 7, the device consists of three parts, namely an extension shaft portion collectively designated 10, a handle engaging portion collectively designated 11 (defined as a hollow engaging portion) and a clamping or locking sleeve collectively designated 12.

10 In detail, the extension shaft portion is preferably formed from solid material such as steel or the like and is preferably substantially circular in cross section, formed with at least one and preferably a plurality of spaced and parallel, longitudinally extending splines 13 on the outer surface thereof.

20 The distal end is provided with a flange 14 from which extends a socket engaging portion 15 which is usually square in cross section. This portion engages within the square recess formed on a standard socket (not illustrated) with the socket being detachably held in position by means of a spring loaded ball 16 on one face 17 of the portion 15 with the ball being compressible into the surface as the socket is engaged thereover.

The handle engaging portion is a hollow cylindrical portion having a plurality of spline receiving grooves 18 formed around the inner wall thereof, the number of grooves preferably equalling the number of splines 13.

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These grooves extend longitudinally from one end to the other but terminate spaced from the end specifically designated 19. This end 19 is preferably formed with a square cross sectioned recess adapted to be snap engaged by a conventional socket wrench handle (not illustrated) which extends at right angles from the longitudinal axis of the extension assembly when positioned on the handle engaging portion 11.

10 It will therefore be appreciated that the shaft extension portion 13 may slidably engage the handle engaging portion 11 so that the overall length of the two portions may be adjusted within the range of the length of the two components or portions.

The end of the handle engaging portion 11, specifically designated 20, is slightly tapered on the exterior surface thereof and this slightly tapered, truncated cone-shaped end 20 is screw threaded externally as clearly shown in Figure 2.

20 A truncated conical sleeve 21 is internally screw threaded as at 22 and slides freely over the extension shaft portion 10 with the screw threads 22 engaging the screw threaded end 20 of the handle engaging portion. This handle engaging portion is provided with at least one and preferably a plurality of spaced and parallel slots 23 formed

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through the wall thereof and extending from the extremity 24 towards the inner end of the conical shaped end 20 so that when the sleeve 12 is tightened upon the end 20, the resiliency of the material forming the conical end 20 permits the sleeve to compress the end 20 and clamp same around the extension shaft portion 13 thus holding it against endwise movement relative to the handle portion but at the same time it will be appreciated that the splines 13 engaging the grooves 18, prevent relative rotational movement between the two portions.

10

While a splined construction is shown in the drawings, nevertheless it will be appreciated that other means may be provided which permit relative lengthwise movement of the two portions yet prevent relative rotation thereof. For example, the portion 13 could be formed with a square or other non-circular cross sectional configuration with a corresponding shape forming the inner bore of the handle engaging portion 11 and the invention is of course not limited to the splines illustrated and described.

20

In use, the desired size socket is engaged upon the end 15 and the desired handle engaged within the end 19. The length of the extension handle assembly is adjusted to suit the circumstances whereupon the sleeve 12 is tightened thus clamping the two parts together.

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SUPPLEMENTARY DISCLOSURE

Figure 8 is an elevational view showing the invention incorporated within a ratchet handle assembly.

Figure 9 is an elevational view showing the invention incorporated within a pivoted handle assembly.

Figures 8 and 9 show further uses for the invention.

10 Figure 8, for example, shows the splined shaft or extension portion collectively designated 10 slidably engageable within the hollow engaging portion which in Figures 8 and 9, is collectively designated 25. In Figures 8 and 9, this hollow extension portion forms the cylindrical handle of a wrench handle assembly and the portion 10 is slidably engageable lengthwise within the hollow handle and is clamped in the desired location relative to the handle, by means of sleeve 12 in a manner similar to that described for the previous embodiment, it being understood that the interior surface of the handle 25 is splined to receive the splines 13 and that the sleeve 21, operates to clamp the extension portion 10 in the desired position in a similar manner.

20 A conventional ratchet assembly or component collectively designated 26 is provided on the distal end of the spline extension portion 10 with a square cross sectioned socket engaging portion 15 extending from one side of the generally circular ratchet component 26, it being understood

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that this ratchet component is conventional so that details thereof are not believed necessary. A spring loaded ball 16 extends from one face of the portion 15 and is compressible against a spring in a conventional manner.

Figure 9 is similar with the exception that a U-shaped yoke 27 is secured to the distal end of the extension shaft portion 10 with the leg 28 thereof lying longitudinally with respect to the portion 10. The square cross sectioned socket engaging portion 15 is secured to an extension 29 which in turn is pivoted between the legs 28 of the yoke 27 by means of a pivot pin 30. This construction may take the form of a universal nut before the portion 15, if desired.

This permits the effective length of the handle assembly to be varied so that it may be used in confined spaces if desired. It also controls the leverage which may be applied to the socket engaged therewith, assisting in avoiding over-torquing of nuts and bolts engaged by the socket.

Since various modification can be made in my invention as hereinabove described, and many apparently widely different embodiments of same made within the spirit and scope of the claims without departing from such spirit and scope, it is intended that all matter contained in the accompanying specification shall be interpreted as illustrative only and not in a limiting sense.

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WHAT I CLAIM AS MY INVENTION IS:

(1) An adjustable extension assembly for socket wrenches and the like comprising in combination a hollow engaging portion and an extension shaft portion slidably engageable therein for lengthwise movement relative thereto, means on the distal end of the extension shaft portion operatively engageable with an associated socket or the like, means to prevent rotation of said extension shaft portion relative to said hollow engaging portion and means to detachably clamp said extension shaft portion to the said hollow engaging portion against relative lengthwise movement one with the other, said means to detachably clamp said extension shaft portion to said hollow engaging portion including a resilient, slightly tapered, truncated cone-shaped end formed on the end of said hollow engaging portion engaged by said extension shaft portion, at least one longitudinally extending slot formed through the wall of said truncated cone-shaped end extending from the distal end thereof inwardly therefrom, said truncated cone-shaped end being screw threaded and an internally screw threaded, tapered, locking sleeve slidably over said extension portion and screw threadably engaging said truncated cone-shaped end, the tightening of said locking sleeve on said truncated cone-shaped end compressing said end around said extension portion and clamping same against endwise movement relative to said hollow engaging portion.

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(2) The invention according to Claim 1 in which said means to prevent rotation of said extension shaft portion relative to said hollow engaging portion includes at least one spline formed on the surface of one of said portion and at least one spline receiving means formed on the surface of the other of said portions engageable for lengthwise sliding movement by said spline.

(3) The invention according to Claim 1 in which said means to prevent rotation of said extension shaft portion relative to said hollow engaging portion includes a plurality of splines formed lengthwise along the length of said extension portion and a plurality of corresponding spline receiving grooves formed lengthwise along the inner surface of the wall of said hollow engaging portion engageable for lengthwise sliding movement by said splines on said extension portion.

(4) The invention according to Claim 1 which includes a plurality of spaced and parallel slots formed through the wall of said truncated cone-shaped end.

(5) The invention according to Claim 1 in which said means on the distal end of said extension shaft portion includes a square cross sectioned projecting portion, and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.

(6) The invention according to Claim 2 in which

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said means on the distal end of said extension shaft portion includes a square cross sectioned projecting portion, and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.

(7) The invention according to Claim 3 in which said means on the distal end of said extension shaft portion includes a square cross sectioned projecting portion, and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.

(8) The invention according to Claim 4 in which said means on the distal end of said extension shaft portion includes a square cross sectioned projecting portion, and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.

CLAIMS SUPPORTED BY THE SUPPLEMENTARY DISCLOSURE

(9) The invention according to Claims 1, 2 or 3 which includes handle engaging means on the distal end of said hollow engaging portion.

(10) The invention according to Claims 4, 5 or 6 which includes handle engaging means on the distal end of said hollow engaging portion.

(11) The invention according to Claims 7 or 8

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which includes handle engaging means on the distal end of said hollow engaging portion.

(12) The invention according to Claims 1, 2 or 3 in which said hollow engaging portion is in the form of a wrench handle, said means on the distal end of said extension shaft portion including a ratchet component and a square cross sectioned projecting portion extending from one side of said ratchet component, and at least one spring loaded ball on the surface of one face of said cross sectioned projecting portion, compressible into said face against pressure of said spring.

(13) The invention according to Claims 4, 5 or 6 in which said hollow engaging portion is in the form of a wrench handle, said means on the distal end of said extension shaft portion including a ratchet component and a square cross sectioned projecting portion extending from one side of said ratchet component, and at least one spring loaded ball on the surface of one face of said cross sectioned projecting portion, compressible into said face against pressure of said spring.

(14) The invention according to Claims 7 or 8 in which said hollow engaging portion is in the form of a wrench handle, said means on the distal end of said extension shaft portion including a ratchet component and a square cross sectioned projecting portion extending from one side of said ratchet component, and at least one spring loaded ball on the surface of one face of said cross sectioned projecting portion, compressible into said face against pressure of said spring.

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(15) The invention according to Claims 1, 2 or 3 in which said hollow engaging portion is in the form of a wrench handle, said means on the distal end of said extension shaft including a U-shaped yoke and a square cross sectioned projecting portion pivotally secured within said yoke and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.

(16) The invention according to Claims 4, 5 or 6 in which said hollow engaging portion is in the form of a wrench handle, said means on the distal end of said extension shaft including a U-shaped yoke and a square cross sectioned projecting portion pivotally secured within said yoke and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.

(17) The invention according to Claims 7 or 8 in which said hollow engaging portion is in the form of a wrench handle, said means on the distal end of said extension shaft including a U-shaped yoke and a square cross sectioned projecting portion pivotally secured within said yoke and at least one spring loaded ball on the surface of one face of said square cross sectioned projecting portion compressible into said face against pressure of said spring.



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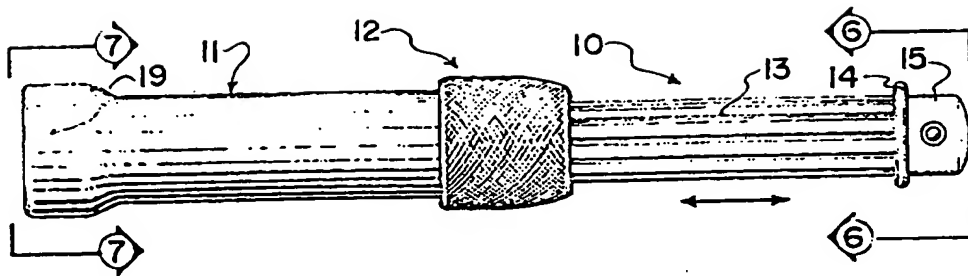


FIG. 1

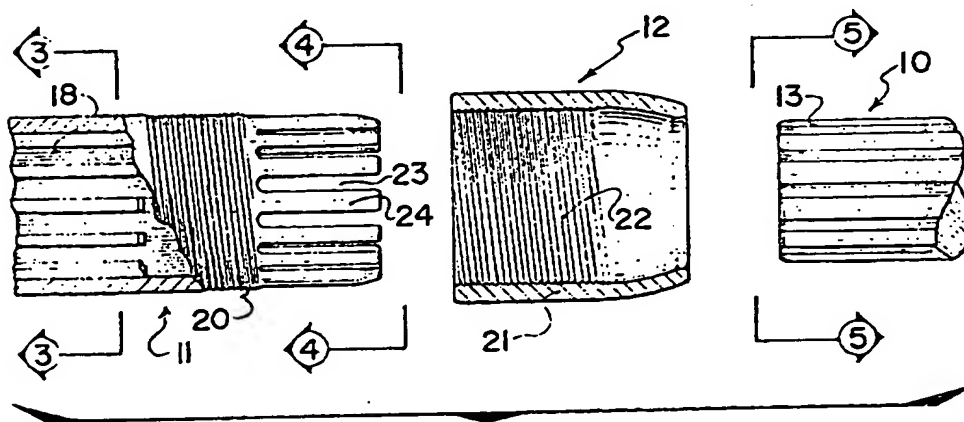


FIG. 2

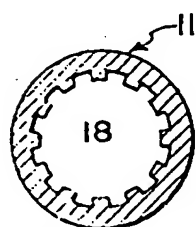


FIG. 3

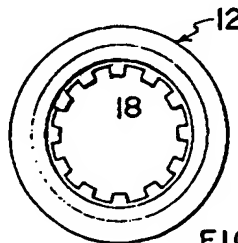


FIG. 4

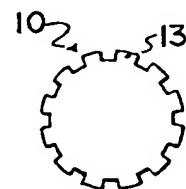


FIG. 5

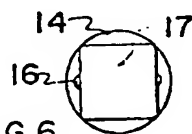


FIG. 6

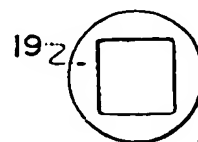


FIG. 7

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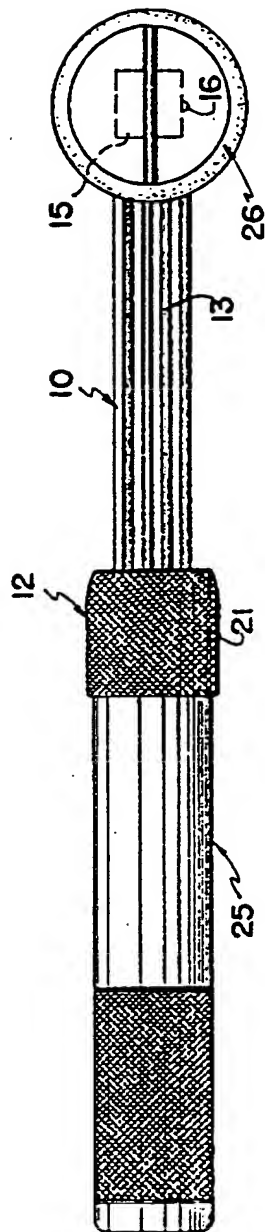


FIG. 8

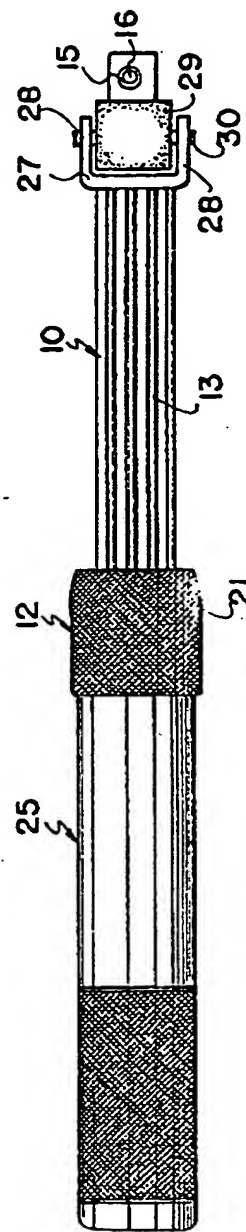


FIG. 9

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